Ethical by Design - A Manifesto

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ABSTRACT

This paper presents a collection of 'ethical by design' principles for considering ethical aspects in the design and implementation of technology-based products and services. It is a work-in-progress describing the need for new, innovative concepts and approaches in ethical design-based thinking. The paper argues that design thinking should and can be 'ethical by design'; that designs should strive to go beyond the ethical guidelines that are set by regulatory bodies and other such governance. This manifesto of 'ethical by design' principles is intended to support developers, providers, and users in the collaborative process of inherently and explicitly including ethics into product and service design.

CCS CONCEPTS

• **Security and privacy** → Social aspects of security and privacy • **Social and professional topics** → Socio-technical systems • **Social and professional topics** → Privacy policies

KEYWORDS

Ethics, Ethical Principles, Design, Product design, Software Design, Technology Design.

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1 INTRODUCTION

This paper presents a collection of principles for considering ethics in the design of technology-based systems. The rationale for such a manifesto of principles originated from a realisation that there was no clear approach that unified thinking across disciplines. While most agree that ethics in design is crucial, there is little effective guidance that enables a broader approach to help guide and signpost people when developing or considering solutions, regardless of the area, market, their own expertise, etc. It is important that product and service designers and developers understand ethics during systems engineering as there have been many cases where designers and developers have implemented system features that violate ethical norms for the user. For example, there has been the use of approaches based upon nudge theory, persuasive technologies and emotional design which in effect manipulate the behaviour of users do things they would ordinarily not countenance (coined by some as 'Evil by Design[2]' and 'Dark Patterns[3]'). Much of the thinking underlying the development of the principles is based on the research of the authors gained through working within multidisciplinary teams in collaborative research projects aimed at advancing the state-of-the-art in the broad areas of technology supporting vulnerable people, such as children with autism spectrum disorder and people living with dementia. Brooks et al. suggest that "...there is a need for (a) new tools for measuring quality of life for people with dementia which do not require participants to respond in prescribed ways; and (b) ethics and consent processes which are more appropriate for non-medical research and which facilitate the involvement of people with dementia" [4]. While focussed on a specific population, these recommendations can be applied to other populations, and indeed, humanity in general. This paper supports that position, broadening its applicability to any product or service and argues that design thinking should and can be 'ethical by design'; namely, the design of products and services should inherently support the ethical development, selection, deployment and use of products and services.

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[2] http://evilbydesign.info

[3] https://darkpatterns.org

Despite many design and other guidelines, things are not getting better. Product and service designers and developers are having difficulties getting access to and understanding ethical guidelines related to creating, adopting, or using a system, service or product. Whilst the User Experience Professionals Association[4] (UXPA) do have a set of ethics principles for User Experience (UX) designers, these principles are mostly aligned to the ethics of the designer and not the design (admittedly these are partly related). The purpose of this paper is to present preliminary principles that can aid understanding, uptake and sustained use of products, systems and services that assist people in everyday life from an ethical perspective. It is argued that the 'ethical by design' manifesto principles offer a blend of accepted and proven approaches drawn from successful application and use in different disciplines that directly address risk, ameliorate errors and ensure that teams can relate ethical guidance to the technology development tasks to be undertaken.

2 Related work

For a product or service to be ethical, (amongst other things) it must support people's autonomy. This means it should take into account and cater to the plethora of different needs of the people using it. User Centred Design (UCD) is an approach that puts the user at the centre of the design process [21]. UCD has been successfully used in many product designs and is supported by standards [16]. The key aim in UCD is to learn what product or service is best suited to meet the needs of the user, and the intended benefit arising from the application of the approach is better usability in the resulting designed product or service. There is a long tradition of user-orientated, experience-based approaches developed to realise these aims and benefits, including user experience [16], contextual design [2], action research [13], and cooperative (participatory) design [5]. Siew and Yeo [22], for example, use participatory action research to augment the development of software for telecenters in rural communities. Many of the UCD concepts have since made their way into usability standards certified by ISO[5], IEC[6] and the FDA[7], which are used to disseminate best practice principles and in some cases, enforce UCD adoption. While these types of perspectives are useful for creating more functional designs, they do not explicitly consider how to consider or incorporate ethical aspects.

A development of design thinking originating from the field of innovation management is based on the direct involvement of 'lead users' [10]. This concept stems from research finding that it is often the user who can realise a commercially successful product or service, rather than the producers [11], and that a particular type of user, the lead user, may be responsible for the majority of the innovative thinking [23]. Innovation management and management science has also developed concepts involving different stakeholders, primarily an amalgam of public sector government, private sector business and academia. This 'triple-helix' model of engagement originated in technology transfer models from academia, and has been adopted as the working base model for the living lab concept [14]. Living labs also offers explicit support to position the user prominently in relation to the other stakeholders. This concept of positioning the user as the focal point and an expert of their own context can help consider decisions that will best suit their particular situation. Conversely, in engineering design, contributions to the research agenda for ethics in engineering design process have been explored [18], which states that "in the operationalisation of design criteria or in discussions about trade-offs, ethical or normative questions are hardly explicitly dealt with". In design of products and services in the telehealth market, discourse analysis research has reported four conflicting discourses: humanist, modernist, political economy and change management [9]. Therefore, this suggests a humanist perspective (i.e., emphasising ethical behaviour and empathy) would explicitly support vulnerable users.

Prior work has been done in examining how human values and ethics might be captured by design. For example, Friedman and Kahn [8] put forward the idea of considering the embodied position (one's own values), exogenous position (societal values), and interactional position (values of the technology user) as a way for designers to become more aware of how values can become integrated in the design of technology and impact its use. Friedman and Kahn then promote engagement in value-sensitive design by considering 12 human values: human welfare, ownership and property, privacy, freedom from bias, universal usability, trust, autonomy, informed consent, accountability, calmness, identity, and environmental sustainability.

As alluded to, none of these methodologies, approaches or philosophies provide an explicit means to consider the ethical principles that often need to be understood and applied. Indeed, these ethical principles are often enshrined in law or organizational statutes, and compliance is required. While most will agree that technologies should ethically designed to positively support the people using them, it is often not clear how to go about ensuring this is accomplished. This challenge is becoming more difficult with the increasing number of invisible, distributed interoperating networks of systems augmented with artificial intelligence.

The authors of this paper have made use of many of the existing user-orientated design philosophies outlined earlier. Some of our recent work has uncovered the need for the explicit support of an ethical approach as part of the design process. In Boger et al. [3], several principles relating to the development of assistive technologies from a transdisciplinary perspective, including complexity and holism, relationships, communication

[4] www.uxpa.org/resources/uxpa-code-professional-conduct

[5] International Organization for Standardization (https://www.iso.org)

[6] International Electrotechnical Commission (http://www.iec.ch)

[7] Food and Drug Administration (https://www.fda.gov/)

and transformation were explored but an ethical perspective was not within scope of that work. In Mulvenna et al. [15], an ethical by design philosophy was discussed as an advance on the 'privacy by design' [19] approach in the specific area of video surveillance to seek to understand the views and attitudes of the people living with dementia and their caregivers in the design and configuration of video surveillance services in their homes, within a clearly defined ethical framework. This is a particularly useful case study where there is a clear trade-off between the significant utility of video cameras in the home of people living with dementia and the resultant impact on their privacy. A utilitarian might conclude that saving a life using video surveillance is a greater good in comparison to the good of preserving privacy in an everyday living area such as a hallway or lounge. Nonetheless, arguably, it should be the user who decides.

As technologies become increasingly complex, pervasive, and interconnected, across different disciplines others are calling for more ethically sound underpinnings for product and service technology development. For example, we can see that those in the machine learning community recognise that the context and positioning of next-generation intelligent systems that will likely monitor people or impact in their lives in unknown ways need to be explored and researched by calling for "Fairness, Accountability, and Transparency" [6]. It is interesting to note that other data scientists have picked up on the potential unfairness of the application of big data in the next generation of data-based products and services [17]. For example, it is important to consider the 'data provenance' of a dataset that is used in machine learning. Data provenance comprises of the history of the dataset, where and how it was collected along with all its potential biases and nuances. Using a machine learning model in the real world to make decisions could be considered unethical if the data scientist did not consider overfitting to noise in the dataset or if some features in the model could be considered as 'data leakage' or indeed the notion that a machine learning model has a shelf-life due to 'concept drift'. Ignorance of such phenomena is unethical and would result in misrepresented and unrealistic promises of a model.

While it is clear that open conversations between stakeholders (including users themselves) is key to creating, evaluating, deploying, and adopting technologies, there is no general guidance as to how to make this happen. Our position, then, is that design based thinking needs to incorporate ethical principles if the outputs are fairly going to serve the needs of the users. If ethical principles are not integrated into the process then the approach cannot be viewed as ethically sound.

3 The 'Ethical by Design' Manifesto

The manifesto principles are intended for everyone. The manifesto is designed to give people across disciplines, sectors and levels of engagement a way to take part in the conversation and to make informed choices, regardless of their familiarity with ethical guidelines or the area of application. The manifesto seeks to go beyond satisfying existing accepted ethical principles of "autonomy, beneficence, non-maleficence and justice" [7] in order to maximise ethical technology design and application. The principles are intentionally broad so as to enable the people using them leeway to explore what is relevant to the particular context; they are not guidelines, but rather signposts to draw attention to aspects that should be considered, discussed, and supported.

We propose the following principles as the starting point for establishing an ethical by design manifesto:

- Design to support the people who will be using the product or service by engendering empathy for users.
- Provide enough information for people to make informed decisions at every stage about whether, when, and how to use the product or service.
- Respect people's right to choose how they engage with the product or service; offer alternatives or customisation.
- Balance appropriate privacy and security with equitable access by as many systems and people as possible, globally.
- Seek to integrate with and support the progression of policy.
- Actively look for and challenge biases and values that may be reflected in a product or service design.
- Complement differing needs, abilities, viewpoints and morals.
- Support shared decision making and feedback.
- Aim for economically, environmentally, and socially sustainable designs.
- Integrate planning for how to handle failure, including transparency and reporting.
- Be realistic about what is possible and needed.
- Support the product or service throughout its lifespan.

4 Discussion and Conclusions

"When discussing ethics, it thus seems advisable to disentangle the concept to discuss the underlying concepts of privacy, autonomy, stigmatisation, human contact, individual approach and affordability." [24].

Every person has a right to understand the product or service and underlying technology with which he or she engages. There is a need for product and service designers, developers, providers, and adopters to identify, discuss, and understand ethical considerations related to design. The principles put forward above are an initial attempt to create a comprehensive ethical by design manifesto that supports understanding how ethical concerns can inherently be addressed by appropriate designs. Their derivation has resulted from an analysis of how ethical principles are incorporated into design decision making in several different areas, including, for example, innovation management, industrial product design, and software engineering. The manner in which the Agile Manifesto (for developing software) communicates simple, clear principles was used as inspiration to formulate actionable 'ethical by design' principles [1]. Another concept

from software development (itself taken from another industry) is the concept of 'fail early' taken from lean computing; namely, validating minimum viable prototypes with users as early as possible in the design/development cycle [21]. This concept informs the manifesto principles of integrated planning, managing realistic ambitions, and informing or engaging with users as early as possible. As mentioned in section 2, innovation management provides the concept of the user first, with a key user as 'lead user', offering early insights into the viability of the prototype service or product [10], which relates also to early engagement with users, sharing decision making and actively supporting people who are prospective users of the product or service.

Future work includes establishing a standing, international working group tasked with refining and evaluating the ethical by design manifesto. It will also include the investigation of ways to enable people to engage with the manifesto, using novel voting paradigm to enable a crowd-sourced preferendum for people to vote positively or negatively for the manifesto's different principles [12]. This approach could be helpful in drawing attention to aspects that people may not have been aware of; relating aspects to each other for the stakeholders and context; fostering discussion; and targeting which aspects are more important for the context.

Other future work could include the application of the manifesto to carry out an audit of an existing product or service, that is, retrospective as well as prospective use of the principles. The ethical by design audit tool could be used prospectively by designers and developers to refine system requirements and could be used retrospectively to assess the ethical design of a developed system. However, users and laypersons could also use this tool retrospectively to assess a technology-based product or service that they are considering to adopt. The ethical by design audit tool could be extended and standardised as an instrument where technologies and services are scored and benchmarked. This would be a useful tool for both service users and service providers.

The ethical by design manifesto is very much a working set of principles, designed to provide discussion and encourage addition, modification and deletion. The manifesto is designed to orientate the product and service design and designer to consider the needs of everyone impacted by the technology. The manifesto promotes and protects the needs of the individual user against "modernist, political economy and change management" discourses and in doing so emphasises ethical behaviour and empathy.

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